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IGCSE Chemistry mock examination January 2011 Paper 1

1.

Question Number	Answer	Mark
9(a)	Anticlockwise from top: Haematite Molten iron Slag	3

Question Number	Answer	Mark
9(b)(i)	$C + O_2 \rightarrow CO_2$, ignore state symbols	1

Question Number	Answer	Mark
9(b)(ii)	Heats it up / raises temperature / exothermic	1

Question Number	Answer	Mark
9(c)	$CaCO_3 \rightarrow CaO + CO_2$	1

Question Number	Answer	Mark
9(d)	Loss of oxygen / Fe^{3+} gains electrons / Fe ions gains electrons / Fe (III) gains oxygen (reject- Fe gains electrons)	1

Question Number	Answer	Mark
9(e)(i)	Aluminium too reactive / more reactive than carbon / accept Al very high in the reactivity series	1

Question Number	Answer	Mark
9(e)(ii)	Any suitable use, eg airplanes PLUS Property must be related, eg low density eg Specified transport - low density (not light) Cooking foil/drink cans - easily moulded / malleable Power cables - good conductor of electricity	
	Window frames / cars - does not corrode Credit any other suitable Answers	2

2.

Question Number	Answer	Mark
10(a)(i)	Any two from: Fizz / bubble Move / darts around Melts / forms a ball / Gets smaller / disappears (reject dissolves)	2

Question Number	Answer	Mark
10(a)(ii)	Sodium + water → sodium hydroxide + hydrogen (accept correct formulae equation)	1

Question Number	Answer	Mark
10(c)	Blue / purple (solution made is) alkaline / (contains) hydroxide ions OH^- / not just 'alkali metal' pH 11→14 (any in range)	2

Question Number	Answer	Mark
10(d)	• Electrons being transferred between oxygen and sodium (can be wrong way round) • Idea of sodium losing electron(s) and oxygen gaining electron(s) • Correct number of electrons involved (sodium lose 1, oxygen gain 2) (sharing = 0 marks)	3

3.

Question Number	Answer	Mark
13(a)	2.8.7	1

Question Number	Answer	Mark
13(b)	7	1

Question Number	Answer	Mark
13(c)	Brown / orange (to) colourless	2

Question Number	Answer	Mark
13(d)(i)	Red / pink (hydrobromic acid formed / H^+ ions present	2

Question Number	Answer	Mark
13(d)(ii)	Blue No acid formed / no reaction / no H^+ ions	2

4.

Question Number	Answer	Mark
14(a)(i)	(1 + 80 +) 81	1

Question Number	Answer	Mark
14(a)(ii)	1.62 ÷ 81 = 0.02 (ALLOW ecf)	2

Question Number	Answer	Mark
14(a)(iii)	0.02 ÷ 0.25 = 0.08 (ALLOW ecf)	2

Question Number	Answer	Mark
14(a)(iv)	0.08 × 81 = 6.5 / 6.48 OR 1.62 × 4= 6.5 / 6.48 (ALLOW ecf)	2

Question Number	Answer	Mark
14(b)(i)	$HBr + NaOH \rightarrow NaBr + H_2O$	1

Question Number	Answer	Mark
14(b)(ii)	Any from: H^+ (ions) react with OH^- (ions) OH^- (ions) gain protons	1

Question Number	Answer	Mark
14(c)(i)	0.02 × 0.2 = 0.004 (20 × 0.2 = 4 (=1 ecf)	2

Question Number	Answer	Mark
14(c)(ii)	0.004 ÷ 0.1 OR 20 × (0.2 ÷ 0.1) = 0.04 dm^3 OR = 40 cm^3 Units needed ALLOW ecf	2

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SECTION A

Question			Mark	Acceptable answers	Notes	Total
1	a	i	M1	neutron		1
			M2	proton		1
			M3	electron		1
		ii	M1	nucleus		1
		iii	M1	12		1
		iv	M1	5		1
		v	M1	2.3	Accept any punctuation (eg , / –)) or none	1
	b	i	M1	helium / beryllium / magnesium / calcium / strontium / barium / radium / He / Be / Mg / Ca / Sr / Ba / Ra		1
		ii	M1	hydrogen / helium / H / He	Accept H_2	1
	c			it has isotopes / atoms have different numbers of neutrons / it is an average	Reject different numbers of protons / electrons	1

Question 5

Question			Mark	Acceptable answers	Notes	Total
5	a		M1	cross in box 1		1
			M2	cross in box 4		1
	b		M1	filter or filtration / centrifuge and decant	Accept description of process Reject any wrong method	1
	c		M1	wash (with water) / add water and filter	Accept description of process	1
			M2	dry / heat / warm / evaporate / leave in warm place / spread onto filter paper / place in (warm) oven	Accept description of process Ignore wrong consequence (eg heat to remove sodium nitrate)	1
					If M1 and M2 in wrong order, award1/2 Reject any wrong method in both M1 and M2	

Question			Mark	Acceptable answers	Notes	Total
6	a		M1	covalent		1
	b		M1	low		1
			M2	weak	If high given for M1, then accept strong	1
			M3	molecules		1
					Mark b independently except that if high given for M1, then accept strong for M2	
	c		M1	shared pairs of electrons between O and both H atoms	Electrons can be shown as dots / crosses / e / any combination of these	1
			M2	two electrons in O inner shell AND four more electrons in O outer shell AND no extra electrons in H	Accept these electrons paired or unpaired	1
					M2 dependent on M1	
	d	i	M1	blue	Ignore qualifiers such as light / dark Reject all other colours	1
			M2	white / grey / pale(r) blue	Accept all combinations of these Reject all other colours	1
		ii	M1	anhydrous copper(II) sulphate	(II) not needed	1
		iii	M1	becomes blue / heat produced / temperature rises / forms hydrated copper(II) sulphate / goes back to original colour	If different colour given in di(M1), accept this colour here	1

Question 7

Question			Mark	Acceptable answers	Notes	Total
7	a	i	M1	propene / propylene	Accept prop-1-ene	1
		ii	M1	yellow / orange / brown	Accept any combination of these colours Reject red	1
			M2	(goes) colourless / decolourised	Ignore clear Ignore discoloured	1
					Do not award mark for single colour if not clear whether start or finish	
	b	i	M1	(contains) hydrogen and carbon / H and C (atoms)	Reject molecules / ions	1
			M2	only	Accept other words with equivalent meaning, such as purely / solely / entirely Award M2 only if correct elements mentioned in M1	1
		ii	M1	only single bonds / no double bonds / no multiple bonds		1
		iii	M1	double bond between two carbon atoms		1
			M2	each carbon bonded to two hydrogen atoms	M2 dependent on M1	1
	c		M1	cross in box 1		1
			M2	cross in box 5		1
	d		M1	C_2H_4 / CH_2CH_2 / $CH_2{=}CH_2$	Accept in either order Ignore state symbols Award 1 mark for both correct formulae but incorrect coefficients Accept H_4C_2 and OH_2	1
			M2	H_2O		1

SECTION A TOTAL: 55 MARKS

Question 8

Question			Mark	Acceptable answers	Notes	Total
11	a	i	M1	fractional distillation / fractionation		1
		ii	M1	crude oil heated	M1 given even if describe laboratory process. Only M1 possible if describe lab process or mention cracking/breaking bonds	1
			M2	(vapour) passed into column/tower	If crude oil heated **in** fractionating column, then give only 1 mark for M1 and M2	1
			M3	fractions collected at different heights		1
			M4	correct reference to boiling point / molecular size / temperature gradient/hot at bottom cooler at top	Do not award if specified temperature gradient is wrong way round	1
					All marks can be gained from suitable diagram	
	b	i	M1	bitumen		1
		ii	M1	gasoline		1
		iii	M1	bitumen		1
		iv	M1	refinery gases	Accept answers in either order	1
			M2	fuel oil	Accept naphtha in place of either	1
	c		M1	oxygen	Ignore air	1
			M2	carbon dioxide	Accept answers in either order	1
			M3	water	Accept steam in place of water	1
					All marks in c are independent	
					Ignore heat	

Question 4

	d	i	M1	C_nH_{2n+2}	Accept other letters/symbols such as x accept $C_nH_{2(n+1)}$	1
		ii	M1	same/similar chemical properties / same functional group	reject trend in chemical properties	
			M2	gradation in physical properties / gradation in specified physical property (eg boiling point)	reject same/similar physical properties	
			M3	neighbouring members differ by CH_2	Ignore references to general formula and references to saturation/unsaturation/specific functional group Accept any two for 1 mark each	2

SECTION B TOTAL: 45 MARKS

PAPER TOTAL: 100 MARKS

10.

Question			Mark	Acceptable answers	Notes	Total
8	a		M1	black		1
			M2	blue	Reject green	1
	b	i	M1	to neutralise/use up/react with all the acid		1
		ii	M1	to remove the solid / copper oxide		1
		iii	M1	to remove/evaporate (some of) the water	Accept "so crystals form"	1
		iv	M1	to dry the crystals / absorb water		1
					TOTAL	6

11.

(a) sulphur 1M

(b) (i) 10 1M

(ii) temperature/concentration of acid/amount of swirling/black cross - 1M

(c) - correct scale on Y-axis 1M
- points plotted correctlty 1M
- curve 1M
- best fit 1M

(d) (i) 0.11 - 2M

(ii) rate would be high/reaction would be fast - 1M
difficult to time accurately - 1M

(e) (i) directly proportional – 1M
concentration doubled/rate twice as fast (similar ratio) - 1M

(ii) twice as many particles in the same space/volume (refer to number of particles in same space)– 1M
twice as many collisions in same unit of time (refer to number of collisions in same unit of time)– 1M

12.

Question Number	Question		
2	(a)		
	Acceptable Answers	Reject	Mark
	• amount metal carbonate / allow mass • form/ surface oven/particle of size metal carbonate • volume limewater / amount limewater • size Bunsen flame / distance of tube from Bunsen/ temp or type of flame **Notes** Max 2		(2)

Question Number	Question		
2	(b)		
	Acceptable Answers	Reject	Mark
	Repeated **Notes**		(1)

Question Number	Question		
2	(c)		
	Acceptable Answers	Reject	Mark
	y scale labelled. Time (for limewater to turn cloudy) in seconds 4 bars of correct height indication of which bar is for which substance **Notes**		(1) (1) (1)

Question Number	Question		
2	(d)		
	Acceptable Answers	Reject	Mark
	magnesium (carbonate) **Notes**		(1)

Question Number	Question		
2	(e)		
	Acceptable Answers	Reject	Mark
	(i) measuring cylinder not vertical (ii) lower volume / reduces (iii) gas syringe Notes		(1) (1) (1)

Question Number	Question		
2	(f)		
	Acceptable Answers	Reject	Mark
	(i) 15 (cm^3) 44 (cm^3) 29 (cm^3) (cq) (ii) 29 / 30 = 0.97 dividing answer to (i) by 30 correct to 2 sf (iii) middle box ticked Notes		(1) (1) (1) (1) (1) (1)